GJB4 gene

gap junction protein beta 4

Normal Function

The *GJB4* gene provides instructions for making a protein called gap junction beta 4, more commonly known as connexin 30.3. This protein is part of the connexin family, a group of proteins that form channels called gap junctions on the surface of cells. Gap junctions open and close to regulate the flow of nutrients, charged atoms (ions), and other signaling molecules from one cell to another. They are essential for direct communication between neighboring cells.

Connexin 30.3 is found in several different tissues, including the outermost layer of the skin (the epidermis). This protein appears to play a role in the growth and maturation of epidermal cells.

Health Conditions Related to Genetic Changes

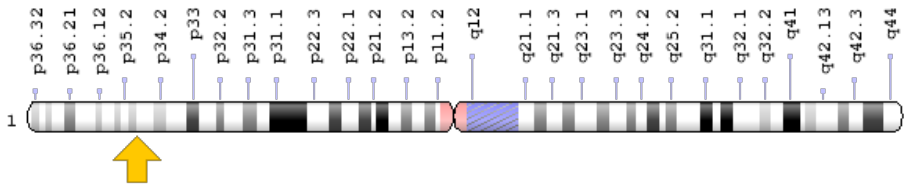
erythrokeratodermia variabilis et progressiva

At least seven *GJB4* gene mutations have been identified in people with erythrokeratodermia variabilis et progressiva (EKVP), a skin disorder characterized by areas of hyperkeratosis, which is abnormally thickened skin, and temporarily reddened patches called erythematous areas. Each of these mutations changes a single protein building block (amino acid) used to make connexin 30.3. Studies suggest that the abnormal protein can build up in a cell structure called the endoplasmic reticulum (ER), triggering a harmful process known as ER stress. Researchers suspect that ER stress damages and leads to the premature death of cells in the epidermis. This cell death leads to skin inflammation, which appears to underlie the development of erythematous areas. The mechanism by which epidermal damage and cell death contributes to hyperkeratosis is poorly understood.

Chromosomal Location

Cytogenetic Location: 1p34.3, which is the short (p) arm of chromosome 1 at position 34.3

Molecular Location: base pairs 34,759,741 to 34,763,724 on chromosome 1 (Homo sapiens Annotation Release 108, GRCh38.p7) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- connexin 30.3
- connexin-30.3
- CX30.3
- CXB4_HUMAN
- EKV
- gap junction beta-4 protein
- gap junction protein, beta 4, 30.3kDa

Additional Information & Resources

Educational Resources

- Biochemistry (fifth edition, 2002): Gap Junctions Allow Ions and Small Molecules to Flow between Communicating Cells
  https://www.ncbi.nlm.nih.gov/books/NBK22492/
- Madame Curie Bioscience Database: Gap Junctions: Cell-Cell Channels in Animals
  https://www.ncbi.nlm.nih.gov/books/NBK6455/
- Molecular Biology of the Cell (fourth edition, 2002): Gap Junctions Allow Small Molecules to Pass Directly from Cell to Cell
  https://www.ncbi.nlm.nih.gov/books/NBK26857/#A3494

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28GJB4%5BTIAB%5D%29+OR+%28connexin+30.3%5BTIAB%5D%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D

OMIM

- GAP JUNCTION PROTEIN, BETA-4
  http://omim.org/entry/605425

Research Resources

- ClinVar
  https://www.ncbi.nlm.nih.gov/clinvar?term=GJB4%5Bgene%5D
- HGNC Gene Family: Gap junction proteins
  http://www.genenames.org/cgi-bin/genefamilies/set/314
- HGNC Gene Symbol Report
  http://www.genenames.org/cgi-bin/gene_symbol_report?q=data/hgnc_data.php&hgnc_id=4286
- NCBI Gene
  https://www.ncbi.nlm.nih.gov/gene/127534
- UniProt
  http://www.uniprot.org/uniprot/Q9NTQ9

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  Free article on PubMed Central: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1288569/
- Richard G, Brown N, Rouan F, Van der Schroeff JG, Bijlsma E, Eichenfield LF, Sybert VP, Greer KE, Hogan P, Campanelli C, Compton JG, Bale SJ, DiGiovanna JJ, Uitto J. Genetic heterogeneity in erythrokeratodermia variabilis: novel mutations in the connexin gene GJB4 (Cx30.3) and genotype-phenotype correlations. J Invest Dermatol. 2003 Apr;120(4):601-9.
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  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/21188847
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Reprinted from Genetics Home Reference:
https://ghr.nlm.nih.gov/gene/GJB4

Reviewed: January 2014
Published: March 21, 2017

Lister Hill National Center for Biomedical Communications
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